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# Landscaping and Reforestation Act Implementation

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## A1.0 INTRODUCTION

During the 2002 Legislative Session, the Delaware State Senate (141<sup>st</sup> General Assembly) passed Senate Bill Number 324: “An Act to amend Title 17 of the Delaware Code relating to transportation construction projects requiring landscaping and reforestation activities.” In addition, the Act added a new subchapter to Title 17 that states the following:

*“Therefore, this subchapter is intended to more precisely reflect a policy requiring the incorporation of landscaping and reforestation in the projects developed by the Department of Transportation for road construction and improvements in the State. This subchapter is intended to provide minimum standards for the volume of landscaping or reforestation that must take place, for how those activities must be planned, and for how much must be allocated to ensure those activities can take place. The Department of Transportation bears the responsibility for providing specific standards that are needed through regulations developed pursuant to this subchapter.”*

The Legislative Intent of Senate Bill Number 324 stated that “...forested land in the State, together with landscape features such as trees, shrubs and ground covers...not only improve the aesthetic value of our State, but carry with them valuable benefits to the health and welfare of our citizens and our environment.” In addition, the Bill continued by stating: “It is likewise declared that the Department of Transportation is a leader in replacing forestlands that are required to be cleared for such projects and in providing travelers throughout the State with scenic vistas along its roadways while maintaining safe design and construction standards.”

This legislation complements DelDOT’s Context Sensitive Design policy of developing transportation solutions by balancing safety, environmental, cultural, and community needs. Further, the legislation works hand-in-hand with DelDOT’s Enhancing Delaware Highways Initiative of employing native plants species in a cost effective way.

(For more information regarding the Livable Delaware Initiative see [http://www.deldot.net/static/pubs\\_forms/manuals/livable\\_delaware/table\\_of\\_contents](http://www.deldot.net/static/pubs_forms/manuals/livable_delaware/table_of_contents))

[.html](http://www.legis.state.de.us/Legislature.nsf/fsLISArchives?openframeset). The Tree legislation can be found on the State of Delaware website: <http://www.legis.state.de.us/Legislature.nsf/fsLISArchives?openframeset>, under the 141<sup>st</sup> General Assembly, Senate Bill #324.)

## A2.0 PURPOSE

The purpose of this appendix is to provide guidance and “specific standards” for the Department of Transportation’s planners, engineers, landscape architects, and consultants’ staffs in implementing the requirements of the Landscaping and Reforestation Act. It provides both technical and design guidance to assure responsible landscape and reforestation planting designs while minimizing both capital costs and the Department’s perpetual site maintenance costs.

This appendix includes guidance, pursuant to the Act, that will complement previous landscaping requirements developed by the Department. It is intended to assist planners and designers in a rational basis for identifying minimum landscaping and reforestation requirements, as well as the subsequent preparation of landscape planting and reforestation plans. It also addresses tree protection and maintenance activities and procedures that should be performed to save existing trees.

## A3.0 DEFINITIONS

The legislation includes definitions for clarification of the Act. Listed below are additional definitions to assist in implementation.

**Afforestation** means the establishment of a forest area in an area on which forest cover has been absent for a long period of

time or the planting of open areas which are not presently in forest cover. (Definition from Maryland “State Forest Conservation Technical Manual” Third Edition, 1997.) Note: The Landscaping and Reforestation Act does not specifically include the word “afforestation”. However, it shall be understood that, for the purpose of this guidance, reforestation and afforestation will be performed to meet the requirements of the Act.

**Critical Root Zone** is a circular region measured outward from a tree trunk representing the area of the roots that must be maintained or protected for the tree’s survival. For the purpose of this guidance document, critical root zone is one foot of radial distance for every inch of tree diameter (DBH) measured at 4.5 feet above the ground, with a minimum radius of eight feet. For specimen trees the critical root zone shall be 1.5 feet for every inch of tree diameter. (Definition from Maryland “State Forest Conservation Technical Manual” Third Edition, 1997.)

**Qualified Professional** means an individual who has the requisite educational background and technical experience to perform the Mitigation Needs Analysis. A Qualified Professional must be approved by the Department of Transportation prior to the commencement of work related to the Act.

**Shade Tree** means an individual deciduous or coniferous tree, typically isolated or standing alone, located in front of or adjacent to an existing residential, institutional, industrial, or commercial property, or a park setting. Shade trees have aesthetic value, provide shade and/or shel-

ter, and allow the passage of people, animals, or vehicles beneath them.

**Tree**, for the purpose of performing the Mitigation and Needs Analysis means an existing woody plant with a trunk that measures at least four inches in diameter at four feet above the ground. (A tree, for the purpose of replacement, mitigation, or enhancement planting, shall mean any woody plant that will eventually achieve the four-inch diameter measurement at four feet above ground. These trees may be planted as seedlings, whips, or caliper stock as typically available from growing nurseries.)

#### **A4.0 PROCEDURES**

The requirements of the Act shall be invoked whenever the Department of Transportation performs a construction project. A “construction project” means any activity undertaken, authorized, or required by the Department of Transportation through which any expressway, arterial, or collector road is:

- (1) Constructed on a new alignment, or
- (2) Widened by adding one or more through travel lanes or turning lanes.

#### **A4.1 MITIGATION AND NEEDS ANALYSIS**

The Act requires that an analysis be performed by the Department of Transportation or its consultant prior to the commencement of construction operations for any proposed road construction or improvement project, excluding local roads.

This analysis shall identify the anticipated impact of the proposed construction activity and identify the quantity of trees to be removed. The Mitigation Needs Analysis shall be performed by a Delaware Registered Landscape Architect, or a Department approved forester, or other qualified professional. However, the planting design plans shall be in accordance with Section 211 of the Act, performed by a Delaware Registered Landscape Architect, and will require review and approval by the Roadside Environmental Group at each design review submittal level.

The plan reviewer (Delaware Registered Landscape Architect, forester, or other qualified professional) should refer to Figure 2, the “Landscaping and Reforestation Act Decision Making Flow Chart”, as a first order of business in the performance of the Mitigation and Needs Analysis.

The Mitigation and Needs Analysis may be initiated with a review of aerial photographs, field surveys, or existing plans. However, it shall be mandatory that the individual performing the Mitigation and Needs Analysis visit the project site to perform a thorough evaluation of the proposed construction impacts and to physically document and count the number of trees that will require removal.

In conducting a Mitigation and Needs Analysis it is necessary to determine the type or class of road being constructed. The Mitigation Needs Analysis is limited to expressway, arterial or collector road construction projects related to new alignments or the widening by adding one or more travel or turning lanes. The road type being constructed can be determined

by referring to DelDOT's Functional Classification Maps. These maps identify road classification for all the state maintained roads within the state and are in accordance with the Federal Highway Administration Functional Classification Guidelines.

The Mitigation and Needs Analysis should be initiated prior to the Semi-Final Submittal by reviewing a set of plans that show the proposed roadway alignment or roadway modifications, including the limits of proposed disturbance (limits of cut and fill). Review of these plans can be supplemented with the review of any available existing aerial photographs, a topographic survey, or existing roadway plans.

The reviewer should identify the number of 4-inch diameter or larger trees that will be removed in the performance of the roadway construction work. (Trees are to be measured at four feet above ground as specified in the "Definitions" portion of the Act.) This quantity identification may be made from the plans (if the topographic survey includes the identification of 4-inch diameter or larger trees) or from a field review. A field visit must be performed in either case to confirm the actual number of 4-inch diameter or larger trees to be removed.

It is recommended that all trees 4-inches in diameter and greater be located on the topographic survey and included as part of the roadway construction Contract Documents. However, the identification/location of each tree to be removed will not be necessary if fifty or more 4-inch or greater trees are to be removed. Please refer to the Landscaping and Refor-

estation Checklist in Section 5 for tree identification.

Landscaping or reforestation plans should be prepared once the tree removal threshold is identified. These landscaping or reforestation plans must follow the prescribed replacement requirements identified in this section below and shall conform with the Department's *Road Design Manual* and the Planting Standards.

The landscape architect must refer to DelDOT's list of plant materials suitable for roadside plantings. The landscape architect may recommend the use of plants not included on this list, but the concurrence of the Roadside Environmental Group or the Environmental Studies Group will be required. The Environmental Studies Group will make plant selections for reforestation mitigations and will be administered under separate contract.

In addition to identifying the trees to be removed, the plans must identify the trees to remain and other vegetation that will require tree protection and maintenance work as part of the roadway construction contract. These plans should include a tree survey, a tree work schedule, limits of tree protection fencing and signage, tree root pruning, limits of mulching, and other necessary tree protection and maintenance details and notes.

All landscaping, reforestation, and tree protection and maintenance plans should be included for review and comment at the Semi-Final design review submittal.

#### **A4.1.1 NO REMOVAL OR CUTTING OF EXISTING TREES**

A landscape planting plan, for aesthetic enhancement, shall be prepared even when a roadway construction project will not require the removal or cutting of any existing trees. Such landscape planting plans shall be prepared by either the Department or its consultants to improve and enhance the right-of-way within the project limits. All landscape planting plans shall be in accordance with Section 211 of the Act, the Department's landscape planting guidelines and specifications, and shall be prepared, signed, and sealed by a Delaware Registered Landscape Architect.

#### **A4.1.2 REMOVAL OF EXISTING SHADE TREES**

Any existing shade trees that would be removed to accommodate a proposed widening, construction, or reconstruction of a major arterial, interstate connector, minor arterial, collector road, or a proposed new road in an urbanized area of the State would be required to be replaced on site, whenever possible. Replacement shade trees would have to be balled and burlapped nursery stock with a minimum height of 16 feet and planted in accordance with the latest edition of the Department's Standard Specifications.

Shade trees are not to be included in the tree counts for the "Removal of 10 or Fewer Trees"; "Removal of more than 10 to 49 Trees"; or the "Removal of 50 Trees or More" unless the shade tree cannot be replaced on site. In those cases the shade tree will be counted as a standard tree for tree mitigation purposes.

#### **A4.1.3 TREE MITIGATION**

Planting design shall be accomplished on site and in accordance with Section 211 of the Act. The planting design shall be sealed by a Delaware Registered Landscape Architect, and will be reviewed and approved by the Roadside Environmental Group at each design review submittal level. (Note: Refer to Section 4.2 if the planting cannot be accomplished within the project's right-of-way.). The planting design shall be in accordance with Section 211 of the Act, performed by a Delaware Registered Landscape Architect, and will require review and approval by the Roadside Environmental Group at each design review submittal level.

#### **A4.1.4 REMOVAL OF 10 OR FEWER TREES**

The removal of 10 or fewer trees for a roadway construction project will require planting at least one new tree for every tree removed. This planting shall be performed within the project's right-of-way, be responsive to site conditions, and include input from the project's stakeholders.

#### **A4.1.5 REMOVAL OF 10 TO 49 TREES**

The removal of more than 10 but fewer than 50 trees for a roadway construction project will require planting two trees for each tree removed. The replacement planting should occur within the project's right-of-way, be responsive to site conditions, and include input from the project's stakeholders.

#### **A4.1.6 REMOVAL OF 50 TREES OR MORE**

The removal of 50 or more trees for a roadway construction project will require reforestation of at least one acre of land for every acre of trees removed. Once the 50 tree removal threshold is reached, tree mitigation is translated to an area basis as opposed to individual tree ratios. As such, the reforestation requirement will also apply to fractions of acreages where 50 or more trees have been removed; equivalent fractions of acreages shall be replanted. Reforestation planting shall be performed at the rates indicated in Figure 1 below. There may be instances where, after 50 trees to be removed are counted, individual and/or isolated trees, not in woodland areas, may exist. For the purpose of calculating reforestation requirements, a 15-foot by 15-foot area (or 225 square feet per tree) can be assumed for the reforestation planting requirement.

There may also be instances where a standard reforestation planting (seedling plantings) would not be appropriate for a particular project or site condition. An example would be where the project site was in an urban or suburban environment/setting that warranted a more developed landscape planting plan to reflect the character of the community and design input by the stakeholders. In this case, a landscape planting plan could be substituted for a standard reforestation planting.

#### **A4.2 INABILITY TO MEET REQUIREMENTS FOR LANDSCAPING OR REFORESTATION**

##### **A4.2.1 OFF-SITE PLANTING**

A hierarchy has been established for landscaping and reforestation when the Department is unable to perform planting activities within the rights-of-way of the roadway construction project:

The Department must:

- First complete the balance of those landscaping and planting activities within other rights-of-way it owns or controls, beginning with rights-of-way which are along the same road and geographically closest to the construction project requiring landscaping and planting...”
- If landscaping and planting activities cannot be performed as described above, then the Department shall move outward from the construction project location “...in all directions until it has met the minimum requirements for landscaping and planting activities....”
- If landscaping and planting activities cannot be performed as described in either condition above “...within any rights-of-way it owns or controls in the State, it shall determine the number of acres of landscaping and planting activities it has been unable to mitigate and perform landscaping and planting activities in the State (or cause the same to be performed) at locations recommended by the Department of Agriculture, Forest Service, or the De-

partment of Natural Resources and Environmental Control.”

#### **A4.2.2 FEE-IN-LIEU**

As a last resort to accomplish the requirements of the Act, “if the Departments of Agriculture or Natural Resources and Environmental Control are unable to identify any locations in the State for the performance of landscaping and planting activities, [the Department of Transportation shall] transfer to either the Department of Agriculture, Forest Service, or the Department of Natural Resources and Environmental Control an amount equal to the dollar value per square yard necessary to plant seedlings in the area it has been unable to mitigate to be used by either Department for conducting landscaping and planting activities in the State under programs administered by those Departments.”

#### **A4.3 EXISTING TREE PROTECTION AND MAINTENANCE**

Tree protection and maintenance should be included in every road construction and improvement project when there is existing vegetation on the site. Retention of the existing vegetation provides an opportunity that most new landscape plantings cannot match.

In addition to preserving existing vegetation, every effort should be made to preserve and protect large, specimen, or champion trees that lie within a road construction or improvement project’s limits. These trees should be included in the project’s tree survey and the requisite tree protection and maintenance work should be incorporated into the construction documents. The landscape architect

should refer to *Big Trees of Delaware (Second Edition)*, prepared by the Delaware Department of Agriculture’s Forest Service. This reference document identifies Delaware’s largest trees’ critical measurements (trunk circumference, tree height, and crown spread) and their location within the state.

Tree protection and maintenance may include the following work items:

- Protective Fencing and Signing
- Root Pruning
- Crown Pruning
- Tree Fertilization
- Tree Watering
- Tree Wall/Well
- Mulching

Some projects may require the use of a Certified Arborist during design to assist in the development of the tree protection and maintenance plans and specifications, as well as assist the Resident Engineer during the construction period.

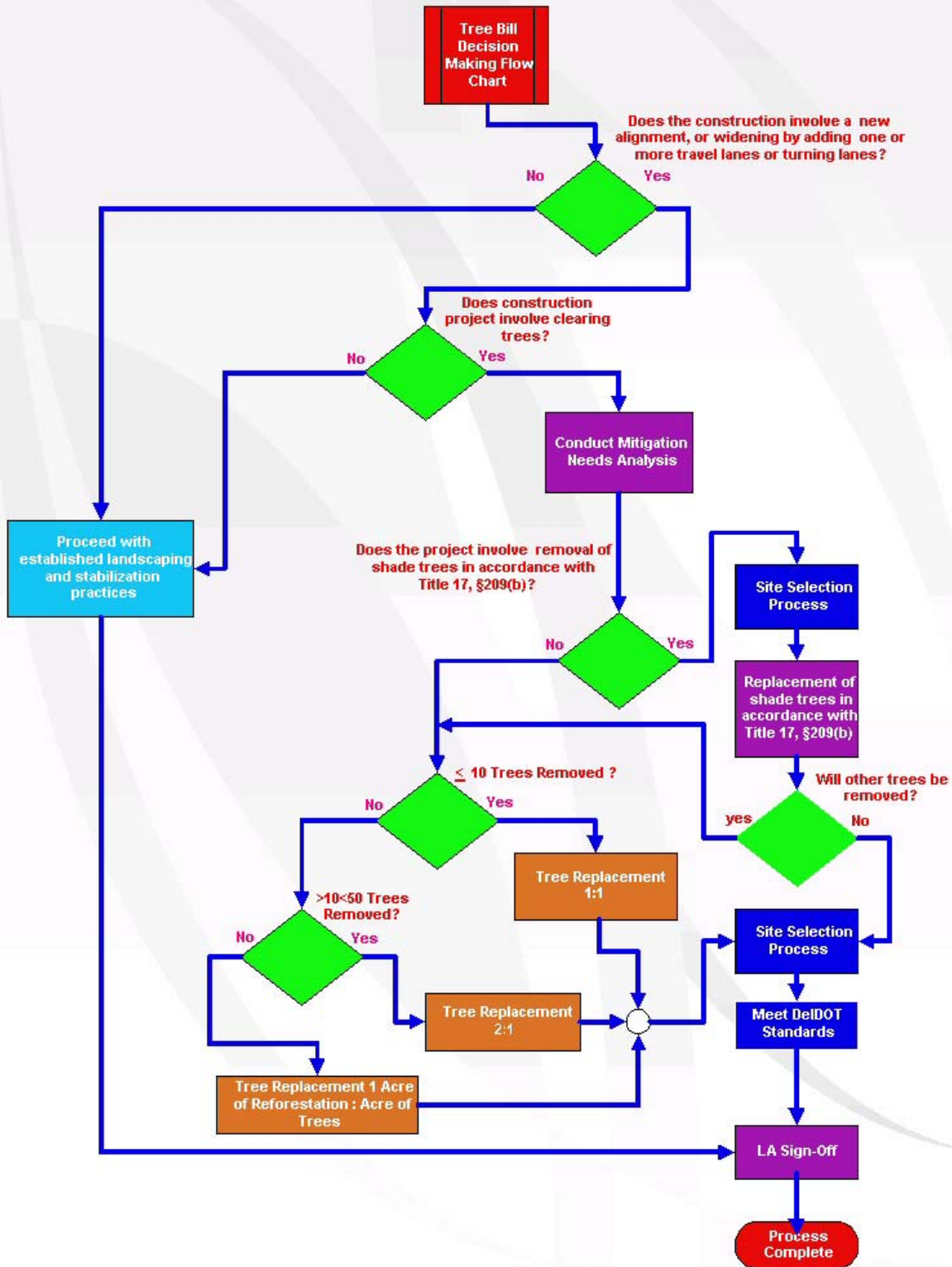
**Figure A-1  
Reforestation Site Stocking**

<b>Size</b>	<b>Number Required (per acre)</b>	<b>Approximate Spacing (ft on center)</b>	<b>Survivability Requirement (At the end of the third season)</b>	
Bare root seedlings or whips	700	8x8	55%	385
Container Grown Seedling Tubes (minimum cavity width 1.5")	450	10x10	65%	290
Container Grown 1,2&3 Gallon	350	12x12	75%	260
Container Grown 5&7 gallon or 1" Caliper B&B	200	15x15	85%	170
Container Grown 15&25 Gallon or 1.5-2" Caliper B&B	100	20x20	100%	100
<b>Notes:</b> <ol style="list-style-type: none"> <li>These stocking and survival requirements are the minimum number estimated to meet the definition of forest from bare land.</li> <li>In certain circumstances, any combination of the above mentioned stocking options, dry seeding, tree shelters, transplants, and/or natural regeneration may be appropriate strategies to fulfill the requirements of the Act. They will be evaluated on a case-by-case basis by the Department.</li> <li>Spacing does not imply that trees or shrubs must be planted in a grid pattern.</li> </ol>				

Source: Adapted from the Maryland Department of Natural Resources' *State Forest Conservation Manual, Third Edition, 1997*.



Figure 2 - Landscaping And Reforestation Act Decision Making Flow Chart



**Figure A-3**  
**Landscaping and Reforestation Checklist**

<b>Tree Number</b>	<b>Common Name</b>	<b>DBH Inches</b>	<b>Spread Feet</b>	<b>Shade Tree</b>	<b>Non-Shade Tree</b>	<b>Forest Tree</b>	<b>Condition</b>
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3							
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